

# NTX XX: EMERGING ISSUES IN NEUROTOXICOLOGY

NOVEMBER 18-21, 2002 / *The Peabody Hotel Conference Center* / LITTLE ROCK, AR

## MONDAY AFTERNOON – 18 NOV 2002 4:30 – 8:00PM

**4:30 – 8:00 PM**     **REGISTRATION MIXER  
CASH BAR**  
*2<sup>nd</sup> Floor Balcony of the Peabody Hotel*

**POSTER & EXHIBIT SET – UP**  
*2<sup>nd</sup> Floor Conference Center  
Poinsett, Chicot and Grampas Rooms*

**5:00PM**     **View “March of the Peabody Ducks”**

## MONDAY EVENING – 18 NOV 2002 5:30 – 8:00PM

**5:30 – 7:00PM**     **WELCOMING RECEPTION**  
*2<sup>nd</sup> Floor Balcony of the Peabody Hotel*

## TUESDAY MORNING – 19 NOV 2002 8:30 – 9:00AM

### SESSION I.

**OPENING OF THE CONFERENCE,  
WELCOME AND OVERVIEW**

*Chair: Joan M. Cranmer, PhD*

**8:30AM**     **Opening of the Conference**  
*Joan M. Cranmer, PhD Conference Chair,  
University of Arkansas for Medical Sciences (UAMS)  
and Arkansas Children’s Hospital (ACH)*

### WELCOME ON BEHALF OF THE HOST INSTITUTIONS

#### *On Behalf of UAMS*

**E. Albert Reece, MD, PhD, MBA**  
*Vice Chancellor and Dean, College of Medicine,  
University of Arkansas for Medical Sciences (UAMS)*

#### *On Behalf of NCTR*

**Daniel A. Casciano, PhD**  
*Director, National Center for Toxicological Research  
(NCTR)*

#### *On Behalf of the Pine Bluff Arsenal*

**Colonel Mark R. Henscheid**  
*Commander, Pine Bluff Arsenal*

**Overview and Goals of the Conference**  
*Joan M. Cranmer, PhD - UAMS & ACH*

*We are committed to making this conference accessible to all individuals. If you have a disability, as identified in the Americans with Disabilities Act, please notify Tina Daniel or a Staff person at the Registration Desk.*

## TUESDAY MORNING – 19 NOV 2002 9:00 – 11:50AM

### SESSION II.

**NEUROIMAGING: STRATEGIES TO ILLUMINATE  
ENVIRONMENT-DISEASE LINKAGES**

*Focusing Unique Needs, Tools, Challenges and Strategies for  
Neurotoxicologists*

*Chair: William Slikker, Jr., PhD*

*This session addresses recent technological innovations which now make it possible to apply many in vivo neuroimaging technologies such as positron emission tomography (PET) and magnetic resonance imaging (MRI) to small animals, including nonhuman primates, rats and mice. The availability of these new technologies coincides with progress in developing animal models of various neurodevelopmental and neurodegenerative dysfunctions and improvements in assessment protocols for identifying deficits in animals that correlate well with human deficits. The integration of neuroimaging techniques with traditional neurotoxicological assessments has the potential to enhance greatly the ability to relate behavioral, cognitive or motor dysfunction induced by a toxicant to structural and functional brain pathology.*

**9:00 – 9:20AM**     **Neuroimaging as a New Approach to  
Neurotoxicology**  
*William Slikker, Jr., PhD  
Director Division of Neurotoxicology, NCTR/FDA*

**9:20 – 9:40**     **Innovative Imaging Approaches: PET  
and Its Applications**  
*Ronald C. Walker, MD  
Director of PET Research, UAMS*

*The history and theory of PET imaging will be presented along with its many clinical applications. The role of PET and MicroPET in research will be examined including the advantages and limitations of these powerful approaches. A special emphasis will be placed on the application of PET imaging to the nervous system and assessment of cell loss including apoptosis.*

**9:40 – 10:15**     **Small Animal Imaging using Positron  
Emission Tomography**  
*Arion Chatziannou, PhD – UCLA and  
Crump Institute for Molecular Imaging*

*Positron Emission Tomography (PET) has proved to be of great significance in the localization of drugs and their site of action. Up until recently, their application has been primarily to humans due to the poor resolution and the design of instrumentation. A new instrument, the MicroPET, has been built specifically for small animal PET imaging. This will provide insight into pharmacokinetic and pharmacodynamic information in animals not previously available. A new application has been the visualization of gene expression. It will also supply information as to the site of action of drugs and/or toxins. Its application to neurotoxicological issues will provide new data not previously available.*

**10:15 – 10:30**     **Break**

**10:30 – 11:05 Magnetic Resonance Spectroscopic Imaging and Its Potential Application to Clinical Neurotoxicology**

H. Cecil Charles, PhD  
Duke Image Analysis Laboratory, Duke University

*Magnetic Resonance Spectroscopy and Imaging (MRS and MRSI) are technologies that are making significant impact on the clinical sciences. They provide the opportunity to detect, analyze and ultimately visualize changes in metabolic processes. No other approach provides such information. The application of these approaches to neurotoxicology will provide answers as to the significance of metabolic perturbations due to toxicologic insult.*

**11:05 – 11:40 High Resolution Imaging: From Organism to Molecule**

Mark P. Ellisman, PhD  
National Center for Microscopy and Imaging Research, University of California - San Diego

*While many imaging technologies are quite useful for the collection of anatomical data, none have the high-resolution capability of electron tomography. Recent data indicates that traditional mitochondrial morphometry will be re-defined with the use of this powerful approach. Glial cells are also being evaluated and the most recent data suggests they occupy about 75% more brain volume than previously reported. The advantages and limitations of electron tomography, in regards to neurotoxicology studies, will be discussed.*

**11:40 – 11:50 Discussion**

**11:50AM Break for Lunch**

**1:15PM Reconvene for Session III**

**TUESDAY AFTERNOON – 19 NOV 2002 1:15 – 5:00PM SESSION III.**

**EMERGING TECHNOLOGIES IN NEUROTOXICOLOGY**

**Chairs: G. Jean Harry, PhD  
Kent E. Vrana, PhD**

*As in the case of other areas of biology, the study of how chemicals affect the nervous system is being influenced by a number of emerging technologies in addition to new neuroimaging technologies. This session will focus on computational toxicology, microarray technology, genomics, proteomics, metabonomics and bioinformatics. All of these emerging technologies exploit recent discoveries in molecular biology to study effects of chemicals at the genetic or molecular level and/or the use of computer technology to process patterns of biological changes to characterize pathways leading to neurotoxicological effects. Computational toxicology integrates computing and information technology with molecular biology to predict neurotoxicological changes based on knowledge about structure other physical properties of pollutants.*

**1:15 – 1:30PM Emerging Technologies in Neurotoxicology: Overview**  
G. Jean Harry, PhD - NIEHS

**1:30 – 2:05 Computational Toxicology**  
Steven P. Bradbury, PhD  
Mid-Continent Ecology Division, Duluth, MN

*Computational toxicology aims to demonstrate the feasibility of setting mechanistically based priorities for chemical risk assessments and to optimize in vivo and in vitro testing requirements through the use of in silico methods and molecular profiling afforded by advances in genomics. As an example of how computational toxicology could prove useful, this presentation will describe efforts to provide*

*predictive computer-based structure activity models and in vitro assays that will identify those compounds most likely to disrupt endocrine disruptors.*

**2:05 – 2:40 Microarray Technology**  
Kent E. Vrana, PhD

Wake Forest University School of Medicine

*Microarray technology provides a unique tool for the determination of gene expression at the level of messenger RNA (mRNA). The simultaneous measurement of the entire human genome (thousands of genes) facilitates the uncovering of specific gene expression patterns that are associated with disease. Thus, gene expression microarray technology can be used to define distinct genes associated with single-nucleotide polymorphisms (SNPs), identifying predisposition to disease and determining polymorphic sites that govern individual responses or susceptibilities. Another important application of microarray technology is in "toxicogenomics", which is predicated on the premise that each individual possess a unique set of polymorphic sites, in turn, exhibiting individual responses to a particular toxic substance. Finally, within the context of neurotoxicological studies, the technique can provide a screening tool for the identification of molecular mechanisms of toxicity, differentiating between cell-specific responses and enabling the researcher to identify those genes and their products (either single or whole pathways) that are involved both in conferring resistance or sensitivity to toxic substances. The lecture will address (1) the potential uses of array data, (2) describe the various array platforms, highlighting both their advantages and disadvantages, (3) provide insight into data analysis and presentation strategies, and (4) provides concrete examples of DNA array studies in neurotoxicological research. Where possible, examples will be drawn from genome wide scale studies in neurotoxicology.*

**2:40 – 3:15 There's No Place Like \_ome . . .  
“-Omics” at the NCTR: Genomics-  
Proteomics-Metabonomics-Bioinformatics**  
Daniel A. Casciano, PhD - Director,  
NCTR

*NCTR has inaugurated several centers of excellence including the functional genomics center, the structural genomics center and the toxicoinformatic center. These three centers utilize DNA microarray techniques to evaluate toxin-induced gene expression, denaturing high pressure liquid chromatography and DNA sequencing to identify single nucleotide polymorphisms, and a number of statistical and data mining and structure-activity tools to analyze data, respectively. In addition, a proteomic and metabonomic capacity was added recently to the omic armamentarium. The lecture will describe NCTR's application and integration of these tools to understand the mechanisms of action of a variety of toxins.*

**Invitation to Tour the National Center for Toxicological Research**  
Daniel A. Casciano, PhD - Director, NCTR

**3:15 – 3:35 Break**

**3:35 – 4:00 cDNA Array Analysis of the Changes in Gene Expression Specifically Produced by Neurotoxic Doses of Amphetamine: Not Quite Mission Impossible**  
John F. Bowyer, PhD - NCTR

**4:00 – 4:25 NMR Study of [1-13C] Glucose Metabolism and Astrocyte-Neuron-Trafficking in Manganese Neurotoxicity**  
Claudia Zwingman, PhD  
Hospital Saint-Luc, Canada

**4:25 – 4:50**      **Toxins and Behavior: Implications of ‘Toxicogenomics’ for Public Policy**  
 Roger Masters, PhD  
 Dartmouth College, Hanover, NH

**4:50 – 5:00**      **Discussion**

**TUESDAY EVENING – 19 NOV 2002    7:00 – 9:00PM**

**SESSION IV – Workshop/Panel Discussion**

**ACRYLAMIDE TOXICITIES AND FOOD SAFETY**

**Chairs:** Richard A. Canady, PhD and  
 Richard LoPachin, PhD

*Acrylamide is a chemical with a variety of uses in industry including water purification, cosmetics, soil stabilization, and special grouting applications. It was first discovered to be present in certain foods as the result of work announced in Sweden in April 2002. It is a known animal carcinogen and causes nerve damage. The Swedish research and subsequent studies in Norway, Switzerland, the United Kingdom and the United States, have found that acrylamide levels in certain starch-based foods indicate a need for evaluation of risk management alternatives. Reviews of the toxicity of acrylamide have focused on occupational exposures or low-level exposures through water, not the relatively constant exposures that appear to be occurring through food. As the chair of the WHO consultation put it: "After reviewing all the available data, we have concluded that the new findings constitute a serious problem. But our current limited knowledge does not allow us to answer all the questions which have been asked by consumers, regulators and other interested parties."*

*This session will lay out the issues facing us, including rapidly developing information about exposure and toxicity, with the intention of drawing ideas from the substantial expertise at the conference regarding what is known and what should be explored for this important new toxicant in our food.*

**7:00 – 7:05PM**      **Creation of a Database for use in Environmental Health Policy Activities**  
 Jerome A. Paulson, MD  
 George Washington University

**7:05 – 7:40**      **Acrylamide Contamination of Food: Risk Assessment and Regulatory Issues**  
 Richard A. Canady, PhD  
 FDA/CFSAN, Division of Risk Assessment

**7:40 – 8:15**      **Is Acrylamide Neuropathy an Axonopathy or a Terminalopathy?**  
 Richard LoPachin, PhD  
 Albert Einstein College of Medicine

**8:15 – 9:00**      **Panel Discussion:**  
**“ACRYLAMIDE IS WIDESPREAD IN OUR FOOD SUPPLY: DO WE KNOW ENOUGH ABOUT ITS NEUROTOXICITY?”**

**Chairs:** Richard A. Canady, PhD and  
 Richard LoPachin, PhD

**Panelists:** Virginia Moser, Merle Paule, Jean Harry,  
 Evelyn Tiffany-Castiglioni

**Questions to Panel:**

- 1) Based on the mechanistic thinking presented, are there new data needs for neurotoxicity relevant to the exposure levels expected through foods?
- 2) Have neurodevelopmental endpoints been adequately assessed for acrylamide?
- 3) What specific studies would be needed to address data gaps (if identified)?
- 4) What is the priority of the studies identified?

**WEDNESDAY MORNING – 20 NOV 2002    8:00 – 9:25AM**

**SESSION V:**

**PARKINSON’S DISEASE, ENVIRONMENT AND GENES**

**Chair:** Cindy Lawler, PhD and TBA

**8:00 – 8:25AM**      **siRNA (Gene Silencing) Technology in Neurotoxicology**  
 Anumantha Kanthasamy, PhD  
 Iowa State Univ

**8:25 – 8:50**      **Developmental Pesticide Exposures and Subsequent Vulnerability to the Parkinson’s Disease Phenotype**  
 Deborah A. Cory-Slechta, PhD  
 University of Rochester Medical School

**8:50 – 9:15**      **Selective Dithiocarbamates Increase Synaptosomal Dopamine Content and Brain Concentrations of Paraquat and Correlation with Potentiation of MPTP and Paraquat Neurotoxicity**  
 Eric K. Richfield, MD, PhD  
 University of Rochester Medical Center

**9:15 – 9:25**      **Discussion**

**WED. MORNING– 20 NOV 2002    9:25 – 11:50AM**

**SESSION VI.**

**INTEGRATIVE APPROACHES TO PARKINSON’S DISEASE ENVIRONMENTAL RESEARCH**

**Chairs:** Kenneth Olden, PhD, Cindy Lawler, PhD and  
 Annette Kirshner, PhD  
 National Institute of Environmental Health Sciences

*The National Institute of Environmental Health Sciences (NIEHS), a component of the National Institutes of Health, recently announced five-year grants totaling \$20 million for three centers to conduct research on the relationship between exposures to environmental agents and subsequent Parkinson's disease.*

*A progressive disorder characterized by muscular rigidity and tremors, slow movement and impaired balance and coordination, Parkinson's disease affects between 1 and 1.5 million people in the U.S., with 50,000 newly diagnosed cases a year. Recent findings suggest that Parkinson's may result from a combination of a person's exposure to harmful environmental agents and the person's inherited susceptibility. The disease is marked by the death of cells in the brain that produce and release the neurotransmitter dopamine. Current drug therapies, which attempt to replace the lost dopamine, can relieve some symptoms but do not cure or slow the disease.*

**9:25 – 10:00**    **The NIEHS Collaborative Centers for Parkinson’s Disease Research Program – An Innovative Approach**  
 Kenneth Olden, PhD - *Director, National Institute of Environmental Health Sciences*

**10:00 - 10:15**    **Break**

**The Parkinson’s Disease Consortium Centers Program . . . .**  
*“– will provide a formal mechanism for “Cross-Talk” between PD clinicians, basic research scientists, and patient. Principal Investigators or Project Directors of the three new Centers will present rationale for the approaches and framework of their overall program.*

*Presentations of the Three New Centers:*

**10:15 – 10:45**    **“Environmental, Genetic and Cellular Determinants of PD” at The Parkinson’s Institute, Sunnyvale, CA with J. William Langston, M.D. as center director.**  
 Presented by Donato Di Monte, MD

*The center will examine risks associated with pesticides and heavy metals, possible protective effects of tobacco and caffeine; the underlying mechanisms of dopamine cell death, and genetically determined susceptibility traits for Parkinson’s disease.*

**10:45 – 11:15**    **“The Emory Collaborative Center for PD Environmental Research” at Emory University, Atlanta, GA with J. Timothy Greenamyre, M.D., Ph.D. as center director.**

Presented by Gary Miller, PhD

*The center will develop new cellular and animal models to study gene-environment interactions in the development of Parkinson’s disease and will focus on how pesticides interact with the proteins that package dopamine within nerves, and the cellular machinery that degrades abnormal proteins.*

**11:15 – 11:45**    **“Center for Gene-Environment Studies in Parkinson’s Disease” at the University of California at Los Angeles with Marie-Francoise Chesselet, M.D., Ph.D. as center director.**

Presented by Marie-Francoise Chesselet, MD, PhD

*The center will study how variations in genes that regulate dopamine levels within neurons may play a role in the increased risk of Parkinson’s disease associated with pesticides, using several model systems as well as human cells and DNA samples from two large and unique California studies of Parkinson’s disease.*

**11:45 – 11:50**    **Discussion**

**11:50AM – 1:00PM**    **Break for Lunch**

**1:00 – 3:30PM**

**Reconvene for Break-Out Sessions VII-A & VII-B**

**Session VII-A:**  
**Workshop on Testing for Developmental Neurotoxicity**  
*In Conway Theater (2B)*

**Session VII-B:**  
**Neurotoxicants and Synaptic Function**  
*In Harris Break Theater (2A)*

**WEDNESDAY EARLY AFT – 20 NOV 2002 1:00 – 3:20PM**

**SESSION VIIIA.** (Concurrent with VIIB)(CONWAY THEATER)

**Workshop/Panel Discussion:**

**TESTING FOR DEVELOPMENTAL NEUROTOXICITY**

**Chairs:**    **William Boyes, PhD and Donald J. O’Shaughnessy, PhD**

*Adverse effects on the nervous system following exposure to environmental chemicals during development have been well documented. In a number of cases (e.g., lead, methylmercury) the developing nervous system appears to be a highly susceptible target. Developmental Neurotoxicity Testing (DNT) guidelines were developed and promulgated in 1991 in response to the need for regulatory-based screening methods for developmental neurotoxicity. In the first broad-scale data call-in for these data (Sept. 99), EPA expanded the scope of the 1991 guideline in recognition of the advances in the science, as well as legislation (i.e. FQPA). The purpose of this Workshop/Panel Discussion is to review history and use of the Developmental Neurotoxicity Testing guidelines, and to discuss, in a panel format, areas for improvement.*

*Speakers will avoid detailed description of highly focused work. Rather, they will use ongoing or recent work to exemplify development of knowledge about developmental processes, risk, and regulation.*

**1:00 – 1:10PM**    **Chairmen’s Overview of the Workshop on Developmental Neurotoxicity**  
 Donald J. O’Shaughnessy, PhD  
*D O’Shaughnessy Consulting*

William Boyes, PhD  
*USEPA/NHEERL/NTD*

**1:10 – 1:30**    **Protecting Children’s Health and Development: A Non-Profit Perspective**  
 Barbara McElgunn, RN  
*Learning Disabilities Association of Canada, Toronto*

**1:30 – 1:50**    **A Government Perspective on the History and Use of the Developmental Neurotoxicology Guidelines**  
 Susan L. Makris, MS - *USEPA/OPP/HED*

**1:50 – 2:10**    **Testing for Developmental Neurotoxicity: Perspective from an Industry Laboratory**  
 Larry P. Sheets, PhD  
*Bayer Corporation, Toxicology Department*

**2:10 – 2:30**    **The Perspective from Academia: Biological Mechanisms versus Regulatory Issues**  
 Theodore A. Slotkin, PhD  
*Duke University Medical Center*

**2:30 – 2:45PM A Review of the Reference Dose and Reference Concentration Process: Identified Gaps in Testing Guidelines**  
Deborah C. Rice, PhD  
*USEPA/NCEA*

**2:30 – 3:20 Round Table Discussion**  
*Chairs:* **William Boyes, PhD**  
*USEPA/NHEERL/NTD*  
**Donald J. O'Shaughnessy, PhD**  
*D O'Shaughnessy Consulting*

**Round Table Discussion Topics**

- 1) A review of the experience using the current guidelines. What is working well and what areas could be a focus for improvements? Data Quality, Sensitivity/ discriminatory power, Study Design, Training
- 2) Alternatives to the DNT: What is the potential for targeted guidelines designed for specific classes of compounds such as the major classes of pesticides such as carbamates or pyrethroids (i.e., if we know the mechanism of action can we do something other than a first tier "screen"?)
- 3) Additions to the DNT: How do we incorporate the need for pharmacokinetics and age-dependent sensitivity data, e.g., evolution of guidelines to include "relative sensitivity" evaluations and quantification of offspring exposure.
- 4) Introducing modern neurobiological concepts and technology to the guideline. What have we learned in the last decade that can guide, direct and improve the ability to evaluate compounds for potential developmental neurotoxicity?

**WED. EARLY AFT – 20 NOV 2002 1:15 – 3:30PM**

**SESSION VIIB.** (Concurrent with VIIA) (Harris Break Theater)

**NEUROTOXICANTS AND SYNAPTIC FUNCTION**

**Chair: William D. Atchison, PhD**

*Chemical synaptic transmission is the fundamental process by which information is transferred in the nervous system. This process is critical to learning and memory as well as growth and differentiation in the nervous system. It is also a surprisingly "plastic" function which can be modified in response to changes in activity in the brain. Synaptic transmission is very sensitive to the actions of a number of environmental chemicals which can affect the process on either the sending (presynaptic), or receiving (postsynaptic) ends of the processor at multiple sites. Some of these chemicals such as lead have been proposed to alter learning and memory perhaps by actions on aspects of synaptic function. Talks in this session will focus on the variety of actions which environmental neurotoxicants have on synaptic function.*

**1:15 – 1:40PM Presynaptic Disruption of Transmitter Release by Pb- an "Illegal Substitution"**  
Janusz B. Suszkiw, PhD  
*University of Cincinnati*

**1:40 – 2:15 Alcohol-Neuroreceptor Interactions: New Concept of the Mechanism of Action**  
Toshio Narahashi, PhD  
*Northwestern University School of Medicine*

**2:15 – 2:40 Disruption of GABAergic Function of Cerebellum by Methylmercury: A Possible Approach to Differential Vulnerability**  
William D. Atchison, PhD  
*Michigan State University*

**2:40 – 3:10 Chronic Exposure to NMDA Receptor and Sodium Channel Blockers During Development in Monkeys and Rats: Long-term Effects on Cognitive Function**  
Merle G. Paule, PhD - *NCTR & UAMS*

**3:10 – 3:30 Break**

**WEDNESDAY LATE AFT – 20 NOV 2002 3:30 – 5:15PM**

**SESSION VIII.**

**BIOLOGICAL AND CHEMICAL TERRORISM**

**Chairs: Larry E. Wright and James Bacon**

**3:30 – 4:00 PM Chemical Terrorism: Chemicals of Concern and a Prospective Examination of Laboratory Preparedness**  
Jimmie L. Valentine, PhD - *UAMS & ACH*

**4:00 – 4:30 Sarin-Induced Neuronal Degeneration: Unexpected New Findings**  
Mohamed B. Abou-Donia, PhD  
*Duke University Medical Center*

**4:30 – 5:30 National Chemical Biological Defense Security Policy and Readiness in a Post 9-11 Era – Fighting a Two-Front War**  
Colonel Mark R. Henscheid  
*Commander, Pine Bluff Arsenal*

**Biological and Chemical Terrorism: The Role of the Pine Bluff Arsenal**  
Larry E. Wright  
*Civilian Executive Assistant, Pine Bluff Arsenal*

**Arkansas' Initiative to Secure the Nation's Vaccine Production Facility**  
James L. Bacon  
*Chairman of the Governor's Task Force for Acquisition of the DoD Vaccine Production Facility*

**Invitation to Conference Participants to a Specially Arranged Tour of The Pine Bluff Arsenal: Pictures and Agenda**  
Colonel Mark R. Henscheid  
*Commander, Pine Bluff Arsenal*

**WEDNESDAY EVENING – 20 NOV 2002 7:00 – 9:00PM**

**SESSION IX.**

**GENERAL NEUROTOXICOLOGY POSTER SESSION**

*Refreshments and Cash Bar*

**Chairs: TBA**

**7:00 – 9:00PM Posters Attended and Discussed  
Visit Exhibits**

*Presentation of papers from poster and informal discussion are a highlight of this meeting. This is an excellent venue to discuss research details and form collaborations. Free communications from poster on any topic of neuroscience and toxicology are welcome. Selection of Pre-Doctoral and Postdoctoral Awardees will be made at this time. Cash and Plaques will be presented on Thursday afternoon.*

**PRE-DOCTORAL STUDENT AWARD COMPETITION**

*Pre-Doctoral Award Committee*

**Richard Seegal, PhD, Chair**

**Eric Richfeld, MD, PhD\*\***

**Nikolay Filipov, PhD**

**Paul Stewart, PhD\*\***

*Pre-Doctoral Students*

|                      |                |                                |
|----------------------|----------------|--------------------------------|
| <b>C. Filibrandt</b> | <i>Mentor:</i> | <b>Dr. Thomas A. Gasiewicz</b> |
| <b>EK Gray</b>       | <i>Mentor:</i> | <b>Dr. Sherry Ferguson</b>     |
| <b>S. Kaul</b>       | <i>Mentor:</i> | <b>Dr. AG Kanthasamy</b>       |
| <b>M. Kitazawa</b>   | <i>Mentor:</i> | <b>Dr. AG Kanthasamy</b>       |
| <b>J. Trivedi</b>    | <i>Mentor:</i> | <b>Dr. Manish Nivsarkar</b>    |
| <b>MA Williamson</b> | <i>Mentor:</i> | <b>Dr. Lisa Opanshuk</b>       |
| <b>LKM Wright</b>    | <i>Mentor:</i> | <b>Dr. MG Paule</b>            |
| <b>Y. Yang</b>       | <i>Mentor:</i> | <b>Dr. AG Kanthasamy</b>       |
| <b>B. Zim</b>        | <i>Mentor:</i> | <b>Dr. Guenter W. Gross</b>    |

**POST-DOCTORAL STUDENT AWARD COMPETITION**

*Post-Doctoral Award Committee*

**Toshio Narahashi, PhD, Chair**

**Jean Harry, PhD**

**Lisa Opanashuk, PhD\***

*Post-Doctoral Students*

|                           |                |                           |
|---------------------------|----------------|---------------------------|
| <b>TK Garg, PhD</b>       | <i>Mentor:</i> | <b>Dr. Jason Y. Chang</b> |
| <b>RL Jakab, PhD</b>      | <i>Mentor:</i> | <b>Dr. John F. Bowyer</b> |
| <b>JR Richardson, PhD</b> | <i>Mentor:</i> | <b>Dr. Gary W. Miller</b> |
| <b>D. Surcel, PhD</b>     | <i>Mentor:</i> | <b>Dr. M. Butan</b>       |

**THURSDAY MORNING – 21 NOV 2002 8:00 – 11:15AM**

**SESSION X.**

**CONSEQUENCES OF EXPOSURE FROM PERSISTENT ORGANIC POLLUTANTS (POPs)**

**Chair: Deborah C. Rice, PhD**

*In May 2001, representatives from over 100 countries convened in Stockholm to sign a treaty for the reduction of persistent organic pollutants (POPs). The initial list of 12 chemicals includes polychlorinated biphenyls (PCBs), dioxins, furans,*

*hexachlorobenzene, and the pesticides aldrin, chlordane, DDT, dieldrin, endrin, heptachlor, mirex, and toxaphene. These chemicals bioconcentrate and bioaccumulate up the food chain, and are persistent in the environment. They are found in particularly high concentrations in animals and humans in circumpolar regions. This symposium will focus on the health effects associated with human exposure to these contaminants.*

**8:00 – 8:20AM Global Cycling of Persistent Organic Pollutants (POPs) and Session Overview**

**Deborah C. Rice, PhD**

*National Center for Environmental Assessment/EPA*

**8:20 – 9:00 Affective and Behavioral Effects Associated with PCBs, Mercury and Lead Exposure Among the Northern Quebec Inuit Children**

**Gina Muckle, PhD**

*Research Center of Laval University Hospital, Quebec, Canada*

**9:00 – 9:40 Specific Behavioral Effects Associated with POPs in Children in a Community of Great Lakes Fish Eaters**

**Paul W. Stewart, PhD**

*State University of New York, Oswego*

**9:40 – 10:20 PCBs, Mercury, and Lead: Each Affects Different Infant Cognitive Endpoints**

**Sandra W. Jacobsen, PhD**

*Wayne State University School of Medicine*

**10:20 – 10:35 Break**

**10:35 – 10:55 Developmental Effects of PCBs and Methylmercury on Striatal Dopamine**

**Richard F. Seegal, PhD**

*Wadsworth Center,*

*New York State Department of Health*

**10:55 – 11:15 Lead Induced Stress Responses in the Endoplasmic Reticulum (ER) of Glia**

**Evelyn Tiffany-Castiglioni, PhD**

*Texas A&M University, College Station, TX*

**11:15 – 11:35 Maternal Exposure to Dioxin Causes Permanent or Semi-Permanent Dysfunction in the Frontal Cortex of Rat Offspring at Behavioral and Molecular Levels**

**Masaki Kakeyama, PhD**

*National Institute for Environmental Studies, Onogawa, Tsukuba, Japan*

**THURSDAY MORNING – 21 NOV 2002 11:35 - 11:50AM**

**SESSION XI.**

**PRESENTATION OF STUDENT AWARDS**

**Chair: Joan Cranmer, PhD and Bob Sonawane, PhD**

**Announce Pre-Doctoral Award Winners**

**Richard Seegal, PhD, Committee Chair**

**Announce Post-Doctoral Award Winners**

**Toshio Narahashi, PhD, Committee Chair**

**Presentation of Awards:**

Morris F. Cranmer, PhD - *Sponsor of Student Awards,  
Cranmer and Associates, Inc.*

**11:50AM – 1:00 PM**     **Break for Lunch**

**1:00 – 1:10PM**     **Board Buses for specially arranged tours  
of the Pine Bluff Arsenal and NCTR**

**THURSDAY AFTERNOON– 21 NOV 2002 1:00 – 5:15PM**

**SESSION XII.**

**SPECIAL TOURS OF THE PINE BLUFF ARSENAL  
AND NCTR**

**1:10PM**            Buses Depart *The Peabody Hotel* for the  
Pine Bluff Arsenal

**PINE BLUFF ARSENAL TOURS**

**Clara Barton Red Cross Domestic Preparedness Center**  
*Mr. Dave Chapman and Mr. Don Cleveland*

**Tour M291 Skin Decontamination Kit Mfg. Facility (FDA  
Approved Device)**  
*Dr. David Smith*

**Windshield Tour Chemical Demilitarization Facility**

**NCTR TOURS** - *Organized by William Slikker, PhD*

**Division of Neurotoxicology**

**NCTR/FDA Nonhuman Primate Center**

**Other NCTR laboratories as time permits**

**4:15PM**     Buses Depart NCTR for *The Peabody Hotel.*

**5:15PM**     Buses arrive *The Peabody Hotel*

**THURSDAY EVENING - 21 NOV 2002 6:30 .....**

**HOSTED CONFERENCE DINNER & SOCIAL EVENING**

**6:30PM**            Cocktails in the *Pinnacle Starlight Lounge*  
Cash Bar

**7:00PM**            Hosted Dinner in the *Pinnacle* on the top  
floor of *The Peabody Hotel* overlooking the  
Arkansas River and City at night

**CLOSING OF THE CONFERENCE**